

REMARKS

The Final Office Action of March 24, 2005, has been received and reviewed.

Claims 1-12 and 14 are currently pending and under consideration in the above-referenced application, each standing rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections Under 35 U.S.C. § 102

Claims 1-3, 5-10, 12, and 14 stand rejected under 35 U.S.C. § 102(a) for reciting subject matter that is allegedly anticipated by background art, which the Office has characterized as admitted prior art, that has been disclosed in the above-referenced application (hereinafter “the purportedly admitted prior art”).

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The purportedly admitted prior art, which primarily appears in Fig. 4 and at paragraphs [0009] and [0036] of the above referenced application, includes a statement that semiconductor devices may include a substrate, a layer of anti-reflective material over the substrate, and another layer comprising silicon nitride over the first layer. The silicon nitride layer includes “non-uniformities or particles of about 120-150 nm dimension . . . , which are referred to as ‘in-film’ particles, at an incidence of about 40,000 or more per eight inch semiconductor wafer.” Paragraph [0009]; *see also* paragraph [0036]. This amounts, on average, to an incidence of 1.27 or more non-uniformities or particles per square millimeter.

Independent claim 1, as proposed to be amended, is directed to a semiconductor device structure with a first layer comprising anti-reflective material and a second layer comprising silicon nitride. The second layer includes, on average, less than 1¼ in-film particles or surface roughness features per square millimeter of surface area.

The 1¼ in-film particles or surface roughness features per square millimeter recited in amended independent claim 1 is less than the 1.27 or more non-uniformities or particles per

square millimeter in the purportedly admitted prior art. Thus, the purportedly admitted prior art does not anticipate each and every element of amended independent claim 1, as would be required to maintain the 35 U.S.C. § 102(a) rejection of independent claim 1.

Claims 2, 3, and 5-7 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Claim 5 is additionally allowable because the purportedly admitted prior art does not include a disclosure that the surface of a layer that comprises anti-reflective material may be substantially free of at least one of measurable particulates or surface roughness. To the contrary, Fig. 4 of the above-referenced application shows a large number of in-film particles 44 on the surface of a dielectric anti-reflective coating ("DARC") film 42. Further, paragraph [0009] of the above referenced application explains that the presence of about 40,000 or more non-uniformities or particles in a silicon nitride layer will probably be problematic due to the increased likelihood that they will cause structural deformities or other problems.

Independent claim 8, as proposed to be amended, recites a semiconductor device structure that includes a first layer and a second layer. The first layer comprises anti-reflective material. The second layer, which is located over the first layer, comprises silicon nitride. Additionally, the second layer includes, on average, less than $1\frac{1}{4}$ in-film particles or surface roughness features of at least 120 nanometers size per square millimeter of surface area.

Again, the purportedly admitted prior art is limited semiconductor device structures with silicon nitride layers that include 1.27 or more in-film particles or surface roughness features per square millimeter of surface area. As such, the purportedly admitted prior art does not anticipate a semiconductor device structure with a layer that comprises silicon nitride and that includes, on average less than $1\frac{1}{4}$ in-film particles or surface roughness features of at least 120 nanometers size per square millimeter of surface area, as is required by amended independent claim 8. Therefore, under 35 U.S.C. § 102(a), the subject matter recited in amended independent claim 8 is allowable over the purportedly admitted prior art.

Each of claims 9, 10, 12, and 14 is allowable, among other reasons, for depending directly or indirectly from claim 8, which is allowable.

Claim 11 is further allowable since the purportedly admitted prior art does not include a disclosure that the surface of a layer that comprises anti-reflective material may be substantially free of at least one of measurable particulates or surface roughness. To the contrary, Fig. 4 of the above-referenced application shows a large number of in-film particles 44 on the surface of a dielectric anti-reflective coating ("DARC") film 42. Further, paragraph [0009] of the above referenced application explains that the presence of about 40,000 or more non-uniformities or particles in a silicon nitride layer will probably be problematic due to the increased likelihood that they will cause structural deformities or other problems.

In view of the foregoing, withdrawal of the 35 U.S.C. § 102(a) rejections of claims 1-3, 5-10, 12, and 14 is respectfully requested.

Rejections Under 35 U.S.C. § 103(a)

Claims 4 and 11 are rejected under 35 U.S.C. § 103(a) for being directed to subject matter that is purportedly unpatentable over the purportedly admitted prior art.

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 4, which depends from claim 1, and claim 11, which depends from claim 8, recite that the anti-reflective material of a first layer of a semiconductor device structure comprises silicon oxynitride ($\text{Si}_x\text{O}_y\text{N}_z$) with silicon, oxygen, and nitrogen atoms in very specific proportions. In particular, claims 4 and 11 recite that x equals about 0.40 to about 0.65 times the

sum of x, y, and z, that y equals about 0.02 to about 0.56 times the sum of x, y, and z, and that z equals about 0.05 to about .033 times the sum of x, y, and z.

Claims 4 and 11 are allowable, among other reasons, for respectively depending from claims 1 and 8, which are allowable.

It is also respectfully submitted that there are at least two reasons that a *prima facie* case of obviousness has not been established against either claim 4 or claim 11.

First, the purportedly admitted prior art does not include any teaching or suggestion of the claimed proportions. More specifically, the above-referenced application does not mention that silicon oxynitride with the claimed proportions of silicon, oxygen, and nitrogen atoms was known before the earliest priority date for the above referenced application.

Second, without improperly relying upon the disclosure of the above-referenced application, one of ordinary skill in the art would not have been motivated to modify a semiconductor device structure to include a silicon oxynitride DARC film with the proportions of silicon, oxygen, and nitrogen atoms recited in claims 4 and 11. It is evident that the Office has relied solely upon the disclosure of the above-referenced application because no other art has been cited in support of the 35 U.S.C. § 103(a) rejection.

As a *prima facie* case of obviousness has not been established against claim 4 or claim 11, the subject matter recited in these claims is allowable over the purportedly admitted prior art.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections of claims 4 and 11 is respectfully solicited.

Entry of Amendments

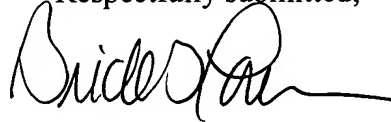
It is respectfully requested that the claim amendments that have been proposed herein be entered. Entry of the proposed amendments would not introduce new matter into the above-referenced application, nor would it require an additional search. Further, the proposed amendments remove all issues that remain for purposes of appeal.

In the event that the proposed amendments are not entered, it is respectfully requested that they be entered in the event that a Notice of Appeal is filed in the above-referenced application.

CONCLUSION

It is respectfully submitted that each of claims 1-12 and 14 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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